

To: Sullivan, Kate[Sullivan.Kate@epa.gov]; Barber, Craig[Barber.Craig@epa.gov]
From: Knightes, Chris
Sent: Tue 8/11/2015 8:39:47 PM
Subject: RE: Notes about Animas River
Proposed Exposure Modeling Animas River Mine Waste Spill vs 1 CDK.docx

I have a few thoughts in the text, but also some notes:

So Total Rec. Metals stands for Total Recoverable metals, which uses a digestion technique, so if there are suspended solid particles of iron (like iron oxide), then Total Rec. Metals, will measure it, though it would be filtered out and not be included in dissolved.

Doing some digging on Acid Mine Drainage, pH coming out of a mine can be as low as -3.6, or they could be up to 5. Also, the water can be get really, so maybe we should get temperature as well? WASP can simulate pH and temperature, so we could include that, if we wanted to.

The coloration in the river may not be due to clay/TSS, it may be due to iron hydroxides. The low pH of the acid mine drainage results in Fe(III) being dissolved when $\text{pH} < \sim 2$, as pH goes past 3, it'll form iron(III)hydroxide, which is a yellow-orange solid, so it may be that it's all a big pile of oxidized iron rather than clay, so it'd be really great to get pH and clay concentration, so we can to tease out what is really happening. If it isn't a huge mass of clay flowing downstream, then it's a different beast to model.

Lastly, WASP can't simulate particulate metals. It can't do precipitation and dissolution, so if it turns out the system is actually due to pH changes and formation of hydroxides, we may need to either be a little creative or we may be limited in how well we can simulate the system. We may need to assume that sorption is the dominant governing process, and simulate based on partitioning to the clay particles.

From: Sullivan, Kate
Sent: Tuesday, August 11, 2015 3:49 PM
To: Barber, Craig; Knightes, Chris
Subject: Notes about Animas River

Please take a look and make suggestions. I'm going to pass this along to the powers that be.

Kate